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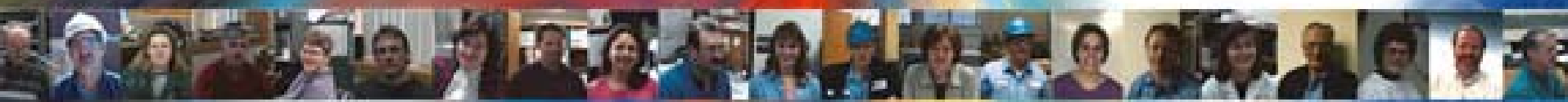
EERC Technology – Putting Research into Practice

Determination of Mercury in Plume at Pleasant Prairie



University of North Dakota

Project Goal

To gain an understanding of mercury chemistry as a plume moves downstream from the stack.

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Twin Otter International
DHC-6-300 Vistaliner

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Major Equipment to Be In Plane

- Tekran Automated Mercury Speciation System
  - Particulate-bound Hg, RGM, Hg^0
- Data Acquisition (Mercury, NO_x, GPS, Timing sequences)
- NO_x Analyzer modified for faster response time.
- Inverter and Power Supply

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Other Sampling And Analytical Equipment

- Heated Probe mounted on the side of the aircraft along with heated sample lines.
- A GPS system to document plume locations
- Valves, Mass Flow Controllers etc.
- In situ measurement of temperature, pressure, and humidity
- Three-dimensional winds and turbulence data.

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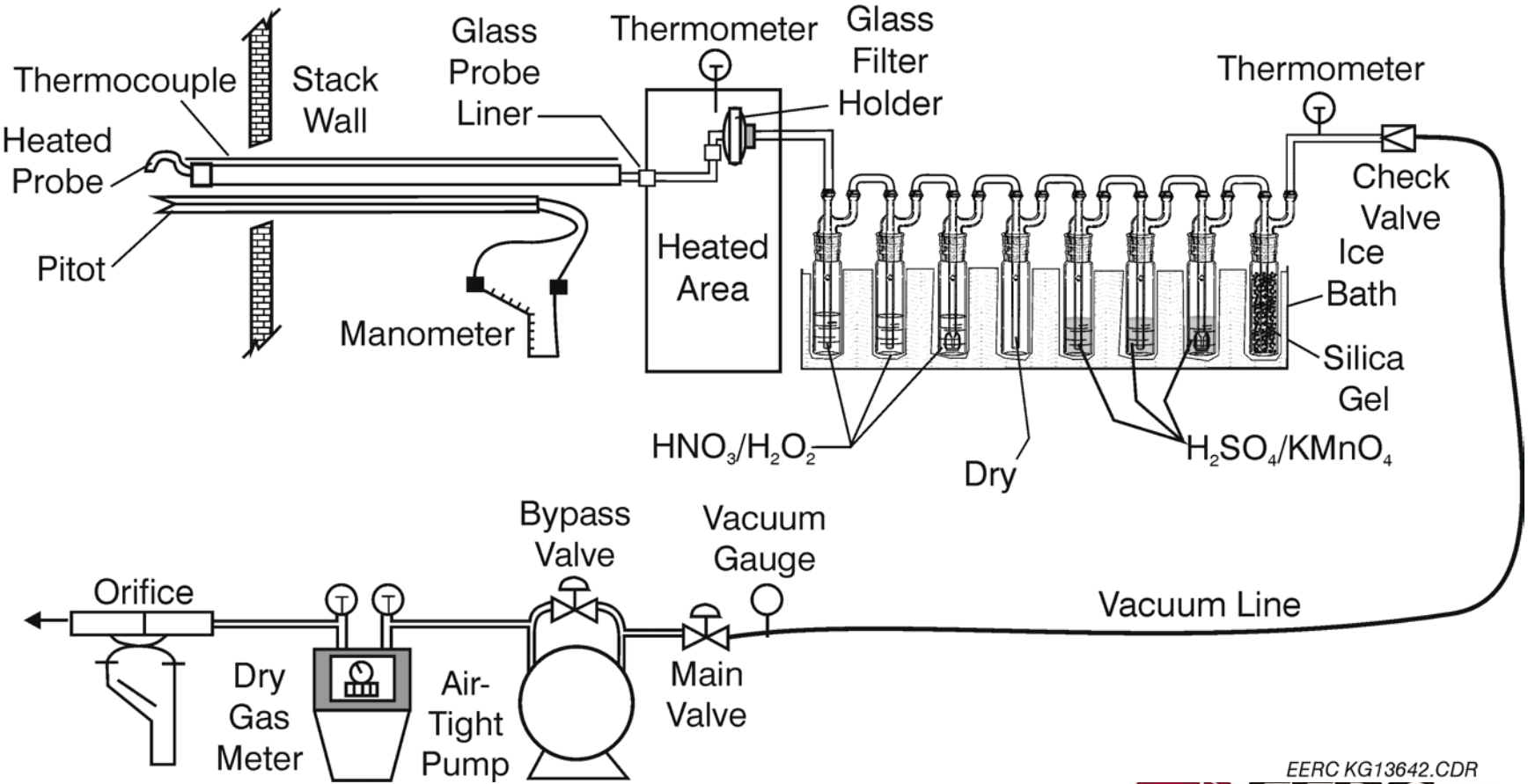
Ontario Hydro Method Train



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Ontario Hydro Method Train

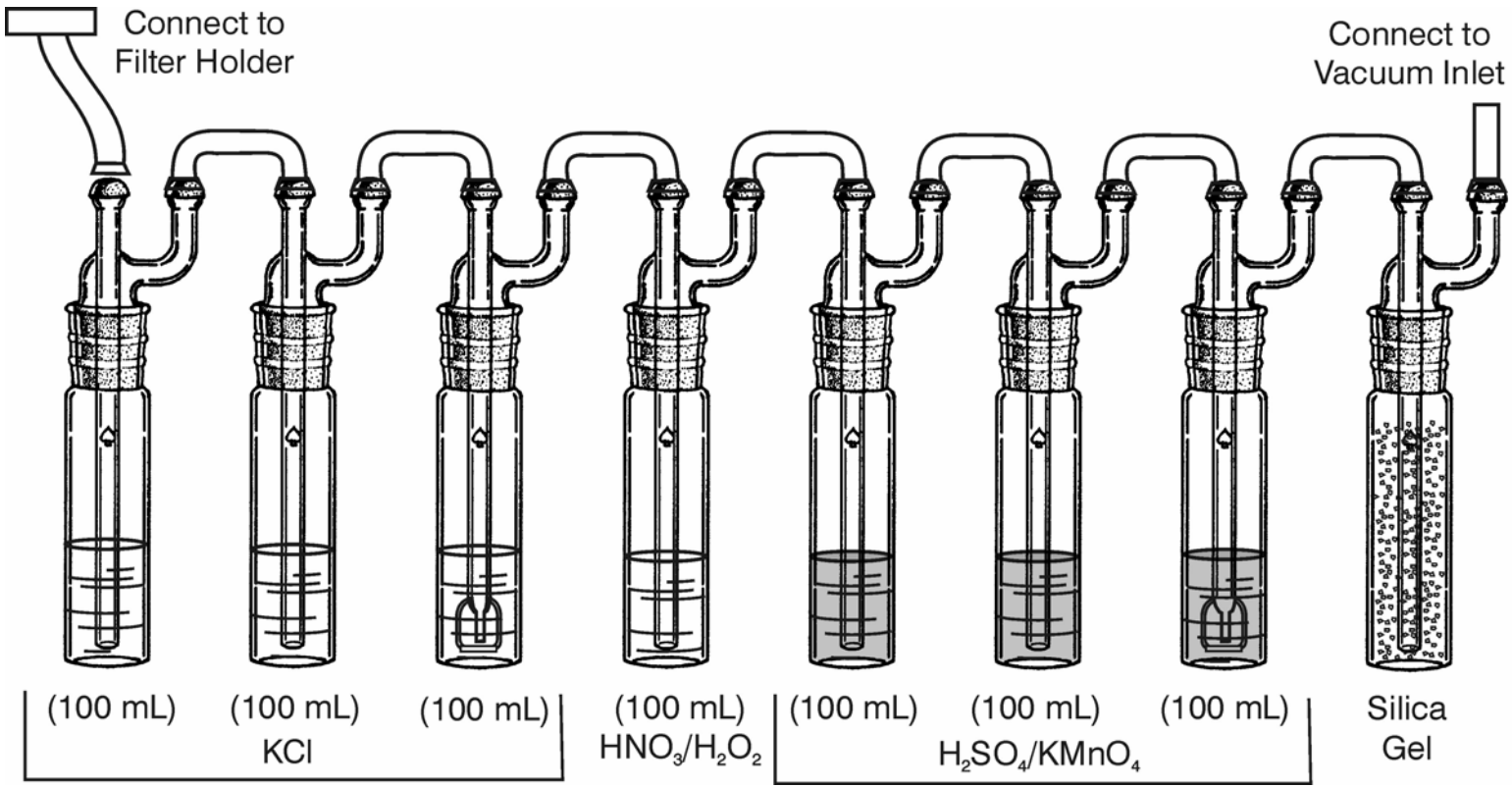

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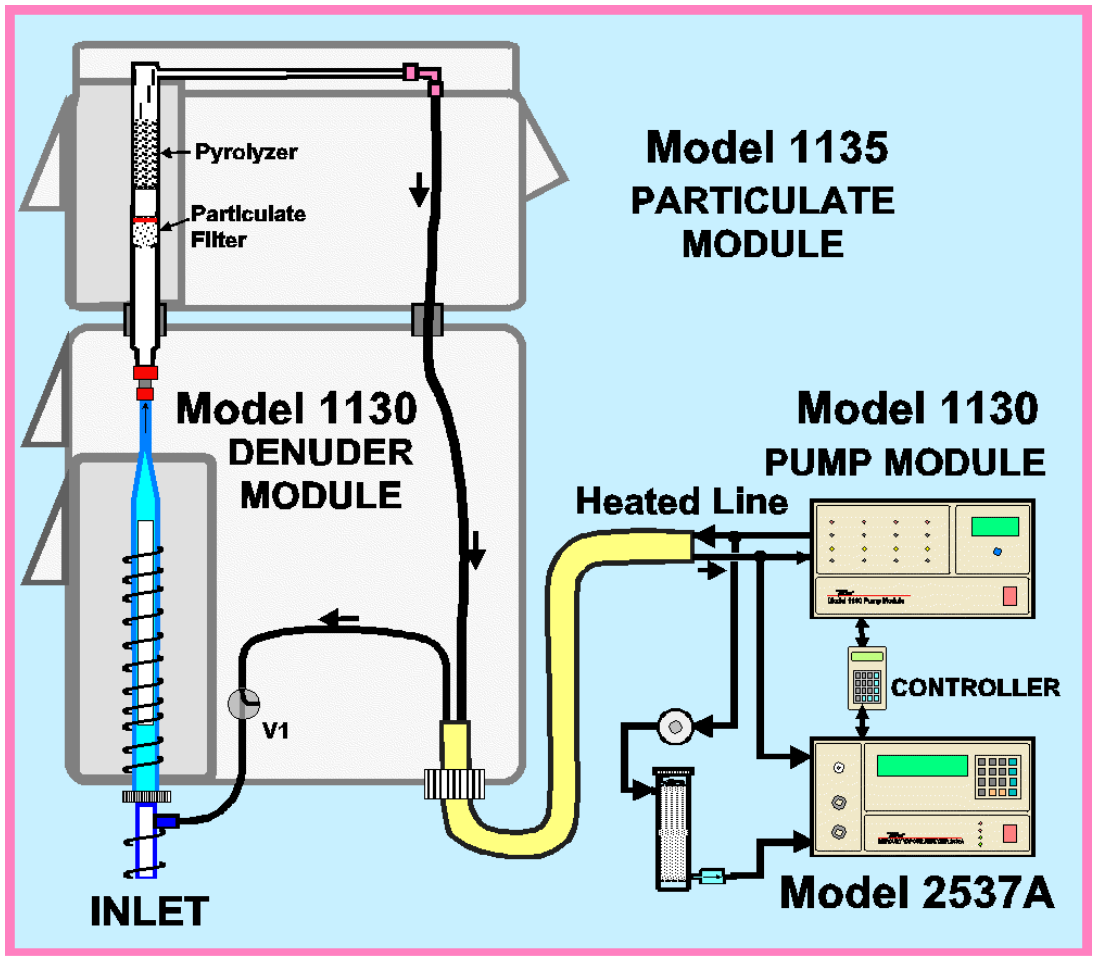
Diagram of the Tekran Automated Hg Analyzer



Plume Sampling

- Annular denuders used to capture RGM
- Hg^0 captured by the Tekran gold trap
- Particulate-bound mercury is captured by a filter then desorbed to the analyzer
- The detection of the plume will be done using a NO_x analyzer

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Plume Sampling (cont.)

- Sampling will be done at three locations within the plume
  - As close to the stack as possible
  - At a distance of about 1-2 miles
  - At a distance of 4-5 miles.
- The plane will fly at about 50m/sec so multiple passes will be necessary
- Depending on the plume diameter at any give location sampling will either traverse the plume or be done along its axis.

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Stack Sampling

- A Hg SCEM will be located at the stack measuring mercury continuously during the entire test
- Three Ontario Hydro Samples will be taken at the stack when the Hg SCEM is set up.
- One additional Ontario Hydro Sample will be taken each flight day.

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